

CHROMOSOME NUMBER IN TWO CYTOLOGICALLY UNKNOWN NEW WORLD FAMILIES, TOVARIACEAE AND VIVIANIACEAE

In a recent survey of cytology in relation to angiosperm phylogeny, Raven (1975) drew attention to the remaining gaps in the chromosome records for families and taxonomically critical genera. A concerted effort has since been made by Raven and others to obtain cytological information for these taxa. This long-term project has yielded results for several groups and the two counts reported here represent the first records for two dicot families.

Tovaria was counted from pollen mother cells, material being fixed in the wild by A. Gentry. *Viviania* was grown from seed provided by O. Zöllner and counts were obtained from root tips. Root tips were treated as recently described by Goldblatt & Endress (1977).

VIVIANIACEAE

Viviania crenata Hook. $2n = 14$. Chile, Prov. Aconcagua, Resguardo Los Patos, 1200 m, Zöllner 8316 (MO).

The family is traditionally included in Geraniaceae but is recognized by several recent phylogenists, including Hutchinson (1959), Takhtajan (1969), and Dahlgren (1975). As revised by Lefor (1975), it comprises four genera, all of southern South America. Vivianiaceae has been associated with several families apart from Geraniaceae, most notably Caryophyllaceae (Centrospermae) (Bortenschlager, 1967; Takhtajan, 1973) and Polemoniaceae (Lefor, 1971). Behnke & Mabry (1977) have shown quite conclusively on chemical and ultrastructural grounds that Vivianiaceae is not related to Centrospermae. A relationship with Polemoniaceae has received little support so that on balance, there seems every reason for treating Vivianiaceae in Geraniales, either as a separate family or in Geraniaceae.

Chromosome number of $n = 7$ in *Viviania crenata* accords with either placement, though not ruling out other treatments. Geraniaceae (sensu stricto) has high base numbers in all genera, with a range $x = 14$ through $x = 10$. Tropaeolaceae has $x = 14, 13, 12$, while lower base numbers are characteristic of Ledocarpaceae ($x = 9$), another segregate of Geraniaceae, and of Balsaminaceae ($x = 8$ and 7) and Limnanthaceae ($x = 5$). Vivianiaceae with $x = 7$ would seem to belong with this latter group, the low base number appearing discordant with the core genera of Geraniaceae itself.

TOVARIACEAE

Tovaria pendula R. & P. $n = 14$. Colombia, Antioquia Dept., Cañas Gordas, Medellin-Turbo, Gentry & León 20205 (COL, MO).

Tovariaceae consists of two species in the single genus *Tovaria*, which ranges from northern South America to Mexico. The family is widely accepted as be-

longing to Capparales and, though generally accorded recognition, Thorne (1976) includes *Tovaria* in Capparaceae. Raven (1975) has suggested $x = 10$ or 11 as basic in Capparaceae, which has a range of numbers from $n = 17, 16, 14, 12, 11, 10$ and 8, while $x = 12$ (or possibly 14) seems basic in Cruciferae, in which a wide range of numbers occur. In the remaining families of the order, Reseda-ceae has $n = 10, 6, 12,$ and 11 and Moringaceae $n = 14$ in the three species studied. *Tovaria* appears well placed in this alliance, and its base number of $x = 14$ accords well with Moringaceae and falls within the range recorded for Capparaceae, although $n = 14$ is unusual in this family, being reported only in two African genera, *Euadenia* and *Buchholzia*. The occurrence of $x = 14$ in another family of Capparales tends to support Raven's hypothesis of a tetraploid origin with $x = 14$ as basic for the order.

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 ADDITIONS TO THE PANAMANIAN CONVULVULACEAE

Since the publication of the Convolvulaceae in the *Flora of Panama* (Austin, 1975) several collections have been made of taxa new to the country. There has also been a name change.